RETI Resource Valuation Methodology
Cost of Generation Calculator

The Cost of Generation Calculator determines the levelized cost of generating power over the life of the resource, and is an input into the RETI resource valuation analysis. The cost of generation is calculated on a $/MWh basis, allowing it to be compared with disparate resource types with different costs and operating over different time periods. It is a simple pro forma financial model that considers the project from the point of view of a developer. It includes the developer's direct costs, charges and incentives, as well as an expected rate of return on the equity. Specifically, it considers:

- Operations and maintenance costs
- Fuel costs (as appropriate)
- Cost of equity investment in capital
- Cost of financing capital
- Taxes, including investment and production credits

Other costs, such as insurance, property taxes, development fees, interest during construction, and debt service reserve funds are included within these major categories. In developing this model, Black & Veatch has strived to make the model as simple as possible while still maintaining an accurate representation of project economics. The purpose of this has been to make the model accessible and easily understood by a wide audience, while also streamlining calculation complexity for the overall RETI model, which will likely include several hundred projects.

Individual line items and calculations are outlined below. Specific assumptions to be used in the RETI analysis are outlined in the RETI Phase 1A Report.

NPV for Equity Return
A cost of equity is assumed as part of the financial assumptions. This number is treated as a hurdle which the project must reach. The project must generate sufficient income from power sales to obtain this return on equity. The NPV for Equity Return discounts all cash flows associated with the project by this prescribed return to generate a present value. If this metric is zero, the project is returning exactly the prescribed amount to equity investors. Higher values mean that the project generates too much money, and lower values mean that it does not generate enough.

Cost of Generation
The year one cost of generation is chosen such that the NPV for Equity Return is zero. Costs of generation in later years are escalated by the assumed value.

Levelized Cost of Generation
The annual cost of generation used in the model project escalates over time. The levelized cost of generation is the constant cost (no escalation) that produces the same net present value as the actual modeled costs of generation over the life of the project.

Annual Generation
The annual generation for the project is calculated based on an 8,760 hour year, the project capacity and the assumed capacity factor.

Fixed Operations and Maintenance
Fixed O & M is calculated from the assumed dollars per kilowatt of capacity per year, the project capacity and the assumed escalation value.

Variable Operations and Maintenance
Variable O & M is calculated from the assumed dollars per megawatt-hour, the annual generation and the assumed escalation value.

Fuel Cost
Annual generation, net plant heat rate, fuel cost and annual escalation of fuel cost determine the annual fuel cost for the project.

Debt Service
Mortgage-style principal and interest payments are calculated for the proportion of the project that is assumed to be financed, the debt rate and the term of the financing.

Tax Depreciation
Depreciation of project assets are calculated for tax purposes. These numbers are based on the MACRS depreciation schedules detailed in the table at the bottom of the spreadsheet. The percent of capital cost to be depreciated is also an input. For simplification, only one depreciation schedule is assumed to apply to a project.

Production Tax Credit (PTC)
The production tax credit is modeled using three parameters: the dollars per megawatt-hour credit, the annual escalation of the credit, and the duration of PTC availability in years.

Investment Tax Credit (ITC)
ITC-eligible projects are credited the prescribed percent of their capital costs in year one.

Taxes
Projects pay an all-in combined tax rate on their taxable income (operating revenue less operating expenses and depreciation) and are credited for applicable tax credits (PTC and ITC).

Total
These are the cash flows associated with the project, including the equity investment portion of the overall capital costs (accounted for as a single value in year zero).

Solving for Year One Cost of Generation
Since NPV for equity return is linear with respect to year one cost of generation, the relationship can be defined by two points. In the "Calculation" box at the top of the spreadsheet, two cost scenarios ($0 and $5) are run using Excel's TABLE() function. The equation for the resulting line is solved for when NPV for equity return is zero and the value is set as the year one cost of generation.